Chapter 9. Glossary of Technical Terms

Note: All acronyms used in the text are defined under "List of Acronyms" found after the Table of Contents and Lists of Tables and Figures in the front of this document.

Acre-foot. The quantity of water that would cover 1 acre to a depth of 1 foot (43,560 cubic feet or 326,700 gallons).

Allowable export. The amount of water allowable for export under the 1995 WQCP; the lesser of the amount specified by the export limits (i.e., percentage of total Delta inflow) and the amount remaining after outflow requirements are met (i.e., available water).

Anadromous species. Fishes that mature in marine waters and migrate to fresh water to spawn.

Anticorrosion coating. The coating of pipelines with paint, epoxy, or other materials to prevent contact of dissimilar metals. The barrier prevents establishment of a corrosion current and corrosion of the pipe.

Appropriative water rights. Water rights held in the form of conditional permits or licenses from SWRCB, which allow the diversion of a specified amount of water from a source for reasonable and beneficial use during all or a portion of the year. In California, previously issued appropriative water rights are superior to and take precedence over newly granted rights. SWRCB's authorizations contain terms and conditions to protect prior water right holders, including Delta and upstream riparian water users, and to protect the public interest in fish and wildlife resources. To a varying degree, SWRCB reserves jurisdiction to establish or revise certain permit or license terms and conditions for salinity control, protection of fish and wildlife, protection of vested water rights, and coordination of terms and conditions between the major water supply projects.

Aquifer. A porous soil or geological formation lying between impermeable strata that contains groundwater; yields groundwater to springs and wells.

Available water. Under the 1995 WQCP, total Delta inflow less Delta outflow requirements.

Bearing capacity. The maximum load that a structure can support, divided by its effective bearing area (the part of the structure that carries the load).

Bending load. The result when the opposite ends of an item are forced together (as when a sheet of paper is folded). Pipelines can be subject to this type of load.

Blowout ponds. Small lakes on Webb and Holland Tracts scoured in the island bottoms by inrushing floodwaters caused by levee failures in 1950 on Webb Tract and in 1980 on both islands.

Borrow area. An excavated area or pit created by the removal of earth material to be used as fill in a different location.

Buttress. To steady a structure by providing greater resistance to lateral forces to prevent failure.

Calibration. See "model calibration".

Candidate species (also candidate threatened or endangered species). Taxa (species or subspecies) of plants and animals currently being considered for listing to be protected as special-status species by USFWS.

Carryover storage. The amount of stored water remaining at the end of the water year (end of September) in San Luis Reservoir (for CVP and SWP) or on the Delta Wetlands reservoir islands.

Cathodic protection system. A process used to prevent pipeline corrosion by passing an electric current through the pipe. When dissimilar metals (the pipeline and soil minerals) are placed in solution together, a corrosion current is established. The cathodic protection system creates an opposite current to minimize corrosion.

Central Delta water. Used in the DeltaSOQ model to represent the source of export water from the central Delta, which includes a mixture of water from the Sacramento, Mokelumne, and Cosumnes Rivers; seawater intrusion from the western Delta; and some portion of the Sacramento River that does not flow directly to the export locations.

Central Valley Project (CVP). The federal water project in California's Central Valley operated by Reclamation.

Channel depletion. The water removed from Delta channels by diversions for irrigation and by open-water evaporation.

Confirmation. See "model confirmation".

Consumptive use. Loss of water on the Delta Wetlands Project islands and other Delta islands through crop ET and open-water evaporation and use for shallow-water management for wetlands and wildlife habitat. Rainfall and channel depletion supply the consumptive-use water.

Conveyance capacity. The volume of water that can be transported by a canal, aqueduct, or ditch. Conveyance capacity is generally measured in cfs.

Cubic feet per second (cfs). A measure of a moving volume of water, sometimes shortened to "second-feet".

DailySOS. A daily operations model used to confirm the adequacy of the analysis completed using DeltaSOS (which simulates the effects of regulatory standards and water management projects on the Delta on a monthly basis).

Delta Cross Channel (DCC). An existing gated structure and channel connecting the Sacramento River at Walnut Grove to the North Fork of the Mokelumne River. The facility was constructed as part of the CVP to control movement of Sacramento River water into the central Delta and to the south-Delta export pumps. Operating criteria currently require the gates to be closed for specific periods to keep downstream migrating fish in the Sacramento River and to prevent flooding of the central Delta.

Delta Drainage Water Quality model (DeltaDWQ). A model developed for the 1995 DEIR/EIS analysis to estimate how much the Delta Wetlands islands contribute to EC, DOC, Cl^-, and Br^- levels at Delta channel locations and in Delta diversions and exports under no-project conditions and under project operations.

Delta exports. The water pumped from the Delta to south-of-Delta users by DWR at Banks Pumping Plant and by Reclamation at the CVP Tracy Pumping Plant, and the amount diverted by CCWD at its Rock Slough and Old River intakes.

Delta in-balance/in-excess conditions. Conditions in the Delta, designated by DWR and Reclamation, that help determine when the Delta Wetlands Project may divert water for storage on its designated reservoir islands. When conditions are "in balance", all Delta inflow is required to meet Delta objectives and satisfy diversions by CCWD, the CVP, the SWP, and Delta riparian and senior appropriative water users. Delta Wetlands would not be allowed to divert water when the Delta is designated as being "in balance" because no additional water would be available for diversion by the Delta Wetlands Project under new water rights; Delta Wetlands reservoir releases may be necessary to increase exports when the Delta is in balance. When DWR and Reclamation determine that Delta conditions are "in excess" and other terms and conditions are met, the Delta Wetlands Project would be allowed to divert available excess water for storage under new appropriative water rights.

Delta-Mendota Canal (DMC). The major conveyance facility of the CVP, which carries water from the Delta to as far south as the southern San Joaquin Valley.

Delta outflow criteria. Minimum water quality or flow standards for the Delta and Suisun Marsh, such as those required by the 1995 WQCP.

Delta standards. A general term referring to all applicable water quality objectives; flow requirements; and other restrictions on diversions, exports, channel flows, or gate operations.

Delta Standards and Operations Simulation model (DeltaSOS). A computer spreadsheet model developed by Jones & Stokes that simulates the effects of regulatory standards and water management projects on the Delta.

Delta Standards, Operations, and Quality model (DeltaSOQ). A modified version of the DeltaSOS model that incorporates equations that predict the water quality of agricultural drainage and Delta Wetlands reservoir island storage. This model also incorporates equations that predict the effects of agricultural drainage and Delta Wetlands discharges on EC levels and DOC concentrations in Delta channels and exports.

Design response spectrum. The specified range of ground motion in response to seismic activity that is assumed for an analysis based on historical data and local soil conditions.

Direct fishery effects. Mortality of fish attributable to Delta Wetlands diversions, including entrainment in Delta Wetlands diversions and losses resulting from changes in habitat.

Disinfection byproducts (DBP). A class of chemicals created during chlorination or other oxidation treatment processes used to disinfect municipal water supplies. Organic content and chloride (Cl^-) and bromide (Br^-) concentrations are the primary variables that influence the formation of DBP compounds.

Dissolved oxygen (DO). Oxygen dissolved in water that is available to supply oxidation and respiration requirements.

Diversions. Water diverted at control points, including reservoir control points. Diversions typically represent basin irrigation diversions, water transfers, municipal diversions, and exports.

Drawdown. The lowering of the water level of a reservoir or other body of water as a result of the withdrawal of water.

DWRSIM. DWR's operations planning model, used to estimate possible effects of increased demands, new facilities, or new standards on SWP operations.

Dynamic and static stability. The stability of levees under seismic movement or without seismic movement.

Electrical conductivity (EC). A general measure of dissolved minerals (i.e., salinity); the most commonly measured variable in Delta waters.

Endangered species. Any plant or animal species or subspecies whose survival is threatened with extinction and that is included in the federal or state list of endangered species.

Entrainment. The process in which fish are drawn into water diversion facilities along with water drawn from a channel or other water body by siphons and/or pumps. Entrainment loss includes all fish not salvaged (i.e., eggs, larvae, juveniles, and adults that pass through the fish screens, are impinged on the fish screens, or are eaten by predators).

Entrapment zone. An area or zone of the Bay-Delta estuary where riverine current meets upstream-flowing estuarine currents and variations in flow interact with particle settling to trap particles. The entrapment zone generally corresponds to a surface salinity range of 2 to 10 mS/cm conductance. The entrapment zone is an important aquatic habitat region associated with high levels of biological productivity.

Erosion. A combination of processes (e.g., wind or tidal action) in which the materials of the earth's surface are loosened, dissolved, or worn away and transported from one place to another by natural agents.

Evapotranspiration (ET). Loss of water from the earth's surface by evaporation from soil or water and by transpiration from plants.

Evolutionarily Significant Unit (ESU). A distinctive group of Pacific salmon or steelhead.

Export limits. A specification in the 1995 WQCP. Delta exports are limited to a percentage of total Delta inflow (generally 35% during February-June and 65% during July-January).

Exports. The water pumped from the Delta to south-of-Delta users by DWR at Banks Pumping Plant and by Reclamation at the CVP Tracy Pumping Plant, and the amount diverted by CCWD at its Rock Slough and Old River intakes.

Factor of safety for slope stability (FS). A calculated number representing the degree of safety of a slope against instability. The FS is expressed mathematically as the ratio of stabilizing effects (forces or moments) and destabilizing effects acting on a potentially unstable soil mass in a slope. When the FS is greater than 1, the soil mass in the slope is, in theory, stable; when FS is less than 1, the slope is, in theory, unstable. For a given slope geometry and soil conditions, a calculated FS is associated with a unique slope failure configuration. The most critical failure configuration is associated with the minimum FS calculated in a slope stability analysis. Several agencies (such as the Association of State Dam Safety Officials and USACE) have developed criteria that provide different design FSs stipulated for various slope conditions, e.g., under long-term loading, shortly after construction, etc. These design FSs are typically above 1 and are minimum values to be achieved for the slope to be considered stable.

Firm storage capacity. An amount equivalent to guaranteed storage capacity. Utility rates usually vary based on guarantee of service. The first priority is to meet firm demands; consequently, this demand is most expensive. Demands that can be met with less reliability are less expensive.

Freeboard. The vertical distance between a design maximum water level and the top of a structure such as a levee, dike, floodwall, or other control surface. The freeboard is a safety margin intended to accommodate unpredictable rises in water level.

Future permitted export pumping capacity. A capacity that may be established for the SWP in the future. If new permit conditions are established for the SWP, the permitted export pumping rate of the SWP pumps would be increased to the physical export pumping capacity of 10,300 cfs. If that occurs, the combined permitted export pumping rate of the SWP and CVP pumps could then equal up to 14,900 cfs or 14,500 cfs.

Gas field. An area that contains closely contiguous reservoirs of commercially valuable gas.

Geotechnical. Of or pertaining to the practical application of geologic science to civil engineering problems.

Historical conditions. The combination of measured inflows and exports, estimated channel depletion and Delta outflow, simulated channel flows, and measured or simulated EC and other water quality variables.

Historical Delta flows. Measured Delta inflows and exports, estimated Delta outflow, and simulated net channel flows corresponding to the inflows and exports.

Hydraulic conductivity. A measure of the capacity of a porous medium to transmit water, often expressed in centimeters per second. The hydraulic conductivity is equal to the rate of flow of water through a cross section of one unit area under a unit hydraulic gradient.

Hydraulic gradient. The rate of change in total hydraulic head per unit distance of flow measured at a specific point and in a given direction, often resulting from frictional effects along the flow path.

Hydraulic head. The force exerted by a column of liquid expressed as the height of the liquid above the point at which the pressure is measured (the force of the liquid column being directly proportional to its height).

Hydraulics. Study of the practical effects and control of moving water; used to refer to the relationship between channel geometry and flow, velocity, and depth of water.

Hydrology. General description of the movement of water in the atmosphere, on the earth surface, in the soil, and in the ground; used in this REIR/EIS to refer to rainfall and streamflow conditions.

Indirect fishery effects. Mortality of fish attributable to other diversions that results from Delta Wetlands effects on Delta flow conditions.

Inflow. The rate (cfs) or volume (TAF) of total streamflow entering the Delta from the Sacramento and San Joaquin Rivers, Yolo Bypass, and the eastside streams.

Interceptor-well system. A seepage-control system that would consist of actively pumped wells installed in the exterior levees of the Delta Wetlands reservoir islands in locations where substantial seepage to adjacent islands is predicted to occur.

Internal inspection. A process required for pipelines. A robotic device, commonly called a "pig", is sent along the inside of the pipe. The pig measures the resistance of electrical current from the pipe to the ground. Areas with abnormally low resistance indicate damage to the pipe's anticorrosion coating.

Interruptible demand. An assumed additional demand for SWP water above the specified monthly demands. Interruptible demand is simulated as 84 TAF/month for 5 months, or 1,400 cfs/month during November through March when San Luis Reservoir is full. DWRSIM assumes that additional SWP deliveries are made to meet interruptible demand when there is unused export capacity and available water in the Delta.

Joint point of diversion. Allowance of CVP and SWP export pumping at either the Banks or Tracy pumping plants.

Leaching. The removal of soluble substances from soil by percolating water.

Levee crest. The top of a levee.

Liquefaction. The process in which loose saturated soils lose strength when subject to seismic activity (i.e., shaking).

Load center. In the utility business, a concentration of demand or users. For example, the Sacramento metropolitan area is a load center. The area consists of a large group of residential, municipal, and industrial users. The cumulative demand of the load center is considered when utility transmission and storage facilities are developed.

Local water supply. In the DWRSIM model, the assumed amount of captured rainfall in areas south of the Delta that can be used to satisfy CVP and SWP demands.

Midwater trawl index. The sum of the weighted catch of fish of four monthly samples (September-December) from numerous locations in the Delta and Suisun Bay. The index is assumed to be a measure of abundance when considered in relation to the catch for all other years of the sampling record (1967-1995). In the Bay-Delta estuary, the index has been developed for striped bass, American shad, delta smelt, Sacramento splittail, longfin smelt, and other species.

Mitigation. Methods to avoid, reduce, rectify, eliminate, or compensate for adverse project impacts.

Mixing. Exchange of mass between two volumes; used in this REIR/EIS to refer to the movement of salt or fish from one location to another caused by the tidal movement of water within the Delta channels.

Model calibration. Adjustments made to a model (i.e., equations or coefficient values) to provide results that more closely follow observed data; used especially during initial model development and testing.

Model confirmation. Comparative testing of model results with measured data to determine the adequacy of model simulations for describing the observed behavior of the modeled variables; used especially during model application to conditions different from those used to calibrate the model.

Municipal Water Quality Investigations (MWQI) program. A program conducted by the DWR Division of Planning and Local Assistance that collects data on a wide variety of water quality variables in Delta inflows and exports. These data provide baseline water quality information in this REIR/EIS.

Net flow. Long-term average of flows in a channel; used to describe the magnitude and direction of flow in a channel after flows during a tidal cycle are averaged.

Outflow. The water flowing out of the Delta into San Francisco Bay.

Outflow requirements. Specifications for the Delta in the 1995 WQCP that encompass water quality protection for agricultural and municipal and industrial uses, Suisun Marsh, and fish habitat. In standard DWR calculations of Delta operations (using DWRSIM), "outflow" represents the difference between inflow and exports; the outflow term therefore includes in-Delta consumptive use.

Overtopping. Passing of water over the top of a levee as a result of wave runup or surge action.

Passive-flow relief-well system. A system of wells that passively relieve elevated hydrostatic pressures in an aquifer by allowing flow to the surface. (Hydrostatic pressure is the pressure exerted by a liquid, such as water, at rest.)

Peak flow. The maximum discharge of a stream during a specified period of time.

Peat soils. Acidic, humus-rich soils that contain a large amount of unconsolidated, semicarbonized, partially decomposed plant debris formed in an anaerobic, water-saturated environment.

Permeability. The capacity of a porous rock, sediment, or soil for transmitting a fluid.

Permitted pumping rate. A rate that may be established by USACE. USACE does not require a permit under Section 404 of the CWA for current SWP export pumping. However, USACE would require a permit if SWP export pumping were to exceed a maximum 3-day average rate of 6,680 cfs. Therefore, the maximum combined export pumping rate that does not require a USACE permit is 11,280 cfs (6,680 cfs for the SWP pumps and 4,600 cfs for the CVP pumps). The restrictions for the period of December 15 to March 15, as interpreted by DWR, allow a combined rate of 11,700 cfs in December and March and a combined maximum 3-day average rate of 12,700 cfs in January and February. (See also "future permitted export pumping capacity".)

Phreatic. Of or pertaining to groundwater.

Phreatic surface. The surface of a body of unconfined groundwater at atmospheric pressure.

Piezometer. A sandpipe monitoring well used to measure the depth to the groundwater surface in the aquifer.

Pipeline balancing. The process of distributing pipeline capacity to efficiently provide service to competing load centers.

Project yield. Average annual water discharged for export from the Delta Wetlands Project islands. Reported in TAF/yr.

QWEST. A calculated flow parameter representing net flow between the central Delta and the western Delta. QWEST criteria have previously been considered for protection of central Delta fish.

Ramping of exports. Gradual change in export pumping that may be required to moderate the effects of rapid changes.

Riparian. Living on or adjacent to a water body, such as a river, lake, or pond.

Riparian habitat. Woody vegetation (trees and shrubs) that grows in soils saturated for a substantial portion of the year, especially on the edges of open water bodies (e.g., lakes, rivers, or ditches) or on levees.

Riparian water rights. Correlative entitlements to water that are held by owners of land bordering natural watercourses. California requires a statement of diversion and use of natural flows on adjacent riparian land under a riparian right.

Riprap. A stone covering used to protect soil or surfaces from erosion by water or the elements.

Rock revetment. A stone covering used to protect soil or surfaces from erosion by water or the elements.

Salinity. Salt measured in ppt, TDS, EC units, or mg/l.

Salvage. Removal of fish from screens on diversion structures and the subsequent return of the fish to the water body.

Sediment. Fragmented mineral or organic material transported or deposited by air, water, or ice.

Seepage. A slow movement of water through permeable soils caused by increases in the hydraulic head. (See also "hydraulic head".)

Seepage flux. The rate of flow of water across a given line or surface, typically expressed in gpm or cfs.

Seismicity. The frequency, intensity, and distribution of earthquake activity in a given area.

Settlement. The sinking of surface material as a result of compaction of soils or sediment caused by an increase in the weight of overlying deposits or by pressure resulting from earth movements.

Shear load. The result when force is applied perpendicular to or on opposite sides of an item (as when a sheet of paper is cut with scissors). Pipelines can be subject to this type of load.

Simulated Disinfection System (SDS). A method of determining THM formation potential. This laboratory analytical method was developed to simulate municipal water treatment facilities' actual disinfection process (and THM concentrations) more closely than other methods; it uses a much lower chlorine (Cl_2) dose and much less contact time.

Simulation. The application of a mathematical representation or model to analyze a theoretical or physical process.

Slope deformations. Changes in the shape or size of a slope.

Smolt. A juvenile fish that has undergone physiological change enabling it to survive in saltwater.

South-of-Delta delivery deficit. Unmet demand, that is, total demand for CVP and SWP water minus total CVP and SWP deliveries. Total deliveries are calculated based on water exported from the Delta and the change in San Luis Reservoir storage. (When San Luis Reservoir storage drops, that amount is added to Delta exports to determine total CVP and SWP deliveries. When San Luis Reservoir storage increases, that amount is subtracted from Delta exports to determine total CVP and SWP deliveries.)

South-of-Delta demands. Demands for CVP and SWP contractors that export water from the Delta.

Spawning. Laying of eggs, especially by fish.

Special Multipurpose Applied Research Technology Station (SMARTS). A test facility at the DWR Bryte facility in West Sacramento that conducts a variety of peat-soil-flooding water-quality experiments under controlled static or continuous water-flow conditions.

Special-status species. Those species listed as threatened or endangered by the state and federal governments or identified as possibly warranting such protection.

Species. The basic category of biological classification intended to designate a single kind of animal or plant.

Splash berm. An extended area of facing on an island levee designed to protect against erosion of the levee crest by wave splash and runup.

State Water Project (SWP). The water project operated by DWR that delivers water from the Sacramento Valley to southern California.

Stratigraphy. The composition, characteristics, distribution, and age relation of layered rocks and soils.

Subsidence. A local or regional sinking of the ground. In the Delta, this results primarily from peat soil being converted into gas.

Surplus Delta outflow. Outflow in excess of the amount required to meet all monthly water demands, protect Delta salinity standards, and comply with the export/inflow objectives of the 1995 WQCP.

Take. A term used in Section 9 of the federal Endangered Species Act that includes harassment of and harm to a species, entrainment, directly and indirectly caused mortality, and actions that adversely modify or destroy habitat.

Threatened species. A species that is likely to become endangered in the foreseeable future and is included in the federal or state list of threatened species.

Tidal flow. Flow caused by tidal changes in stage and hydraulic gradient; describes the fluctuating flows in a channel caused by the tide.

Toe berm. The section projecting at the base of a dam, levee, or retaining wall.

Total dissolved solids (TDS). A measure of the total concentration of disintegrated organic and inorganic material or salt in water.

Transport. Movement of mass from one location to another; used in this REIR/EIS to refer to the movement of salt or fish from one location to another caused by net flows.

Trihalomethane (THM). A class of carcinogenic substances, including chloroform ($CHCl_3$) and bromoform ($CHBr_3$), formed from chlorination of drinking-water supplies.

Trihalomethane formation potential (THMFP). The potential for creation of THMs during chlorination or other oxidation treatment processes used for disinfection of municipal water supplies; an index of the maximum possible THM concentrations that could be produced by maximum chlorination of Delta water.

Ultraviolet absorbance (UVA). A physical measurement used in the study of humic acids and THM precursors, often found to be linearly related to DOC concentration. UVA may provide a measure of the humic and fulvic acid portion of total DOC in a water sample; this portion of total DOC is thought to be the precursor for THM.

Unbundled rates. The individual rates for separate service components of a particular utility. For example, natural gas utilities can be broken down into separate service components such as gas procurement, transportation, storage, and delivery with distinct rate schedules for each service. Deregulation of the utility industry has allowed this unbundling of the services to promote market competition.

Vernalis Adaptive Management Plan (VAMP). Multiyear program for studying the survival of salmon smolts from the San Joaquin River; uses pulse flows and export restrictions.

Water demand. A monthly schedule of water deliveries specified at a point of diversion in an operations model analysis.

Water right. A grant, permit, decree, appropriation, or claim to the use of water for beneficial purposes. California has a dual system of water rights. riparian and appropriative. *Riparian water rights* are held by owners of land bordering a surface water source. *Appropriative water rights* allow the exclusive diversion of a specified amount of water from a source for a reasonable and beneficial use. (See also "riparian water rights" and "appropriative water rights".)

Water Treatment Plant (WTP) model. An EPA model used for the 1995 DEIR/EIS to estimate THM concentrations at a typical water treatment plant that may use Delta exports containing water released from the Delta Wetlands Project islands. The model consists of a series of subroutines that simulate removal of organic THM precursor compounds and formation of THM. A more detailed description of the operation of the WTP model is provided in Appendix C5 of the 1995 DEIR/EIS. The model predicts total THM concentration, then estimates the relative concentrations of each of the four types of THM molecules by using separate regression equations for each type of THM molecule.

Wetlands. Areas supporting vegetation typical of soils that are saturated for a major portion of the year.

Wheeling. Use of SWP or CVP Delta pumping facilities to pump and convey water for another party.

Wind fetch. An area of water over which wind blows, generating waves.

X2. The location in the Bay-Delta estuary of the 2-ppt-TDS isohaline 1 meter off the bottom; an isohaline is a line connecting all points of equal salinity.

Yield. An annual quantity of water that can be delivered to a service area from a water project on a specified delivery schedule.

Yield acceleration. Pseudostatic horizontal force that will give a calculated factor of safety of 1 in slope-stability analyses. (See "factor of safety for slope stability".)